

Preliminary - For Review Only

NAVSEA STANDARD ITEM

FY-06

ITEM NO: 009-15
DATE: 29 JUL 2004
CATEGORY: II

1. SCOPE:

1.1 Title: Rotating Machinery; balance

2. REFERENCES:

2.1 S9245-AR-TSM-010/PROP, Marine Propeller Inspection, Repair and Certification

3. REQUIREMENTS:

3.1 Measure and record the maximum eccentricity of the rotor shaft and installed components relative to the points of support using dial indicators.

3.2 Balance rotating machinery assemblies or components in accordance with the following requirements and procedures:

3.2.1 Except for propellers, if the design operating speed of the component to be balanced is less than 150 revolutions per minute (RPM), the rotor including shaft shall be balanced by symmetrically supporting the rotor on **2** knife edges and applying a correction to attain a gravity balance.

3.2.2 Except for propellers, if the design operating speed of the component to be balanced is equal to or greater than 150 RPM, the rotor including shaft shall be balanced with equipment which requires rotation of the work piece.

3.2.3 Propellers shall be balanced in accordance with 2.1.

3.2.4 Types of correction:

<u>TYPES OF CORRECTION</u>	<u>N 1/</u>	<u>ROTOR CHARACTERISTIC 1/</u>
Single-plane	0 - 1000	L/D Less than or Equal to 0.5
	0 - 150	L/D Greater than 0.5
2 -plane	Greater than 1000	L/D Less than or Equal to 0.5
	Greater than 150	L/D Greater than 0.5

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TYPES OF CORRECTION	N	1/	ROTOR CHARACTERISTIC	1/
Multi-plane			Flexible:	Unable to correct by 2-plane balancing

1/

L = Length of rotor mass, exclusive of shaft

D = Diameter of rotor mass, exclusive of shaft

N = Maximum operating RPM

3.2.5 Allowable unbalance: The values determined by the following formulas are permitted in each plane of correction. However, if unbalance is measured in 2 or more planes, the resultant unbalance forces cannot exceed the allowable amount determined by single plane correction.

$$U = \frac{4W}{N}$$

for maximum operating speeds in excess of 1000 RPM, or

$$U = \frac{4000W}{N^2}$$

for maximum operating speeds between 150 RPM and 1000 RPM, or

$$U = 0.177W \text{ for maximum operating speeds below 150 RPM}$$

U = Maximum allowable residual unbalance in ounce-inches

W = Weight of rotating parts in pounds

N = Maximum operating RPM of rotating parts being balanced

3.2.6 When the computation for converting displacement measurements to ounce-inches of force unbalance is an approximation, verification shall be made by adding a trial weight to the rotor, equal and opposite to the calculated ounce-inches of force. If putty is used as a trial weight, it shall be removed, weighed and a permanent compensating weight shall be installed in its place.

3.3 Submit one legible copy, in hard copy or electronic media, of a report listing results of the requirements of 3.1 and 3.2 to the SUPERVISOR. The report shall include the following information:

3.3.1 Ship's name and hull number

3.3.2 Contractor and subcontractor

3.3.3 Job Order and Work Item number

3.3.4 Unit and component identification

3.3.5 Manufacturer and model number of balance machine

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3.3.6 Date of last calibration, by whom it was calibrated, and when the next calibration is due for the balancing machine

3.3.7 Maximum total indicated runout of rotor or balancing arbor

3.3.8 Weight of rotor assembly in pounds

3.3.9 Design operating RPM of rotor

3.3.10 Computation of allowable unbalance in ounce-inches

3.3.11 Measured unbalance, prior to and after balancing, in ounce-inches

3.4 Submit one legible copy, in hard copy or electronic media, of a report listing computations or procedures for converting displacement measurements to ounce-inches of unbalance force to the SUPERVISOR, when the machine used to balance components indicates displacement measurements in lieu of direct unbalance forces.

4. NOTES:

4.1 None.